

Draft

Quality Assurance Project Plan

Review and Organization of Existing Environmental Data for Upper Animas Mining District, San Juan County, Colorado

Contract Number W912QR-12-D-0001
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Figure 1 Upper Animas River Watershed Study Area [PWS Figure 2B]

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Appendix A List of Documents to be Reviewed
Appendix B Document Evaluation Checklist

Acronyms and Abbreviations

CB&I	CB&I Federal Services LLC
CEG	Certified Engineering Geologist
CHG	Certified Hydrogeologist
DQO	Data Quality Objective
NA	not applicable
PE	Professional Engineer
PG	Professional Geologist
PM	project manager
PMP	Project Management Professional
POC	point of contact
PWS	Performance Work Statement
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
QSD	Qualified SWPPP Developer
RPM	remedial project manager
UAMD	Upper Animas Mining District
UFP	Uniform Federal Policy
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
WS	worksheet

Introduction

CB&I Federal Services LLC (CB&I) has been contracted by the U.S. Army Corps of Engineers, Omaha District, (USACE) to perform an environmental data review and organization for the Upper Animas Mining District (UAMD) in San Juan County, Colorado, for the U.S. Environmental Protection Agency (USEPA) under Contract Number W912QR-12-D-0001. This Quality Assurance Project Plan (QAPP) has been prepared to guide the data review and assessment activities required to successfully perform this task.

The scope of the data review will include Cement Creek, Mineral Creek, and portions of the Upper Animas River (Figure 1) as defined in the Performance Work Statement (PWS) dated 30 January 2015. Studies and investigations within the UAMD have been performed primarily within the last 20 to 25 years, although some relevant data may be obtained from older investigations such as a topographic survey conducted in the area in the late 1800s.

This QAPP has been prepared in USEPA QAPP format based on the requirements of the *Uniform Federal Policy (UFP) for Quality Assurance Project Plans (QAPPs): Evaluating, Assessing, and Documenting Environmental Collection and Use Programs, Part 2A: UFP-QAPP Workbook* (Intergovernmental Data Quality Task Force, 2005) and *Optimized UFP-QAPP Worksheets* (Intergovernmental Data Quality Task Force, 2012). The purpose of this QAPP is to document the environmental data review activities and to provide an evaluation of the data. Worksheets provided in this QAPP document the application of quality control (QC) and quality assurance (QA) procedures to the environmental data review and organization activities to assure that the results are of the type and quality sufficient to proceed with development of a data gap analysis and a remedial investigation/ feasibility study assessment. The success of the environmental data review process depends on the quality of the collection of environmental data and information. Because the data have been collected by a number of both governmental and private organizations over a period of 20 to 25 years, it is likely that not all of the data were collected under the same QC and QA procedures.

To effectively assess the uniformity and appropriateness of the data, we believe the quality of the data should be evaluated. This will depend on the adequacy of the QC and QA procedures proposed in these studies and investigations, and the effectiveness of their implementation. This QAPP is written to not only assess how the data review activities will be conducted, but to also evaluate and rank the data collection activities conducted by the organizations that prepared the reports. The highest evaluation rankings (level of evidence) for scientific soundness and defensibility of the data will be for investigations and studies that were conducted in conformance with appropriate QC and QA procedures (i.e., work conducted under approved plans, using approved methods and procedures).

QAPP Worksheet #1 and #2: Title and Approval Page

1. Project Identifying Information

- a. Project Name: Review and Organization of Existing Environmental Data
- b. Site Location: Upper Animas Mining District, San Juan County, Colorado
- c. Contract Number: Base Contract W912QR-12-D-0001

2. Lead Organization Approvals

- a. CB&I Project Manager

_____	_____	_____	_____
Name	Title	Signature	Date

- b. CB&I Quality Manager

_____	_____	_____	_____
Name	Title	Signature	Date

3. Federal Regulatory Agency Approval

- a. USEPA Remedial Project Manager

_____	_____	_____	_____
Name	Title	Signature	Date

4. State Regulatory Agency – Not Applicable (NA)

5. Other Stakeholders – Funding Agency Approval

- a. USACE Project Manager

_____	_____	_____	_____
Name	Title	Signature	Date

- b. USACE Quality Assurance Manager

_____	_____	_____	_____
Name	Title	Signature	Date

6. List plans and reports from previous investigation relevant to this project.

As provided in the PWS, the sources of data include, but are not limited to, the following:

- USGS Professional Paper 1651 – “Integrated Investigations of Environmental Effects of Historical Mining in the Animas River Watershed, San Juan County, Colorado” 2007.
- “Use Attainability Analysis” – ARSG for the Colorado Water Quality Control Commission
- ARSG Section 319 sampling and reports.
- Other USGS studies and investigations of the Animas River Watershed [also known as UAMD].
- Various USEPA sampling projects – data is housed in SCRIBE & Storet.
- Ongoing USEPA surface water sampling for the Aquatic Ecological Risk Assessment.
- USEPA data collected for Site Assessment and HRS.
- Environmental data collected by BLM.
- Data and information collected by the Colorado Department of Minerals, Reclamation, and Safety (formerly known as the Colorado Department of Mining and Geology).
- Colorado Division of Game and Fish.
- Sunnyside Gold Company water quality data reports to Colorado Water Quality Control Division.

Appendix A provides a partial list of the relevant documents to be reviewed, the primary objective of this project. This initial list, containing documents for the Cement Creek drainage, is the only list obtained to date. Document lists for Mineral Creek and portions of the upper Animas River will be added as they are obtained. Documents will be obtained from sources listed in the PWS and any other sources that become known during the search. Additional documents will be added to the list as they are discovered, and a complete list of all documents reviewed will be provided in the Summary Report.

Crosswalk: UFP-QAPP Optimized Workbook to 2106-G-05 QAPP

Optimized UFP-QAPP Worksheets		2106-G-05 QAPP Guidance Section	
1 & 2	Title and Approval Page	2.2.1	Title, Version, and Approval/Sign-Off
3 & 5	Project Organization and QAPP Distribution	2.2.3	Distribution List
		2.2.4	Project Organization and Schedule
4 , 7, & 8	Personnel Qualifications and Sign-off Sheet	2.2.1	Title, Version, and Approval/Sign-Off
		2.2.7	Special Training Requirements and Certification
6	Communication Pathways	2.2.4	Project Organization and Schedule
9	Project Planning Session Summary	2.2.5	Project Background, Overview, and Intended Use of Data
11	Project/Data Quality Objectives	2.2.6	Data/Project Quality Objectives and Measurement Performance Criteria
14 & 16	Project Tasks & Schedule	2.2.4	Project Organization and Schedule
29	Project Documents and Records	2.2.8	Documentation and Records Requirements

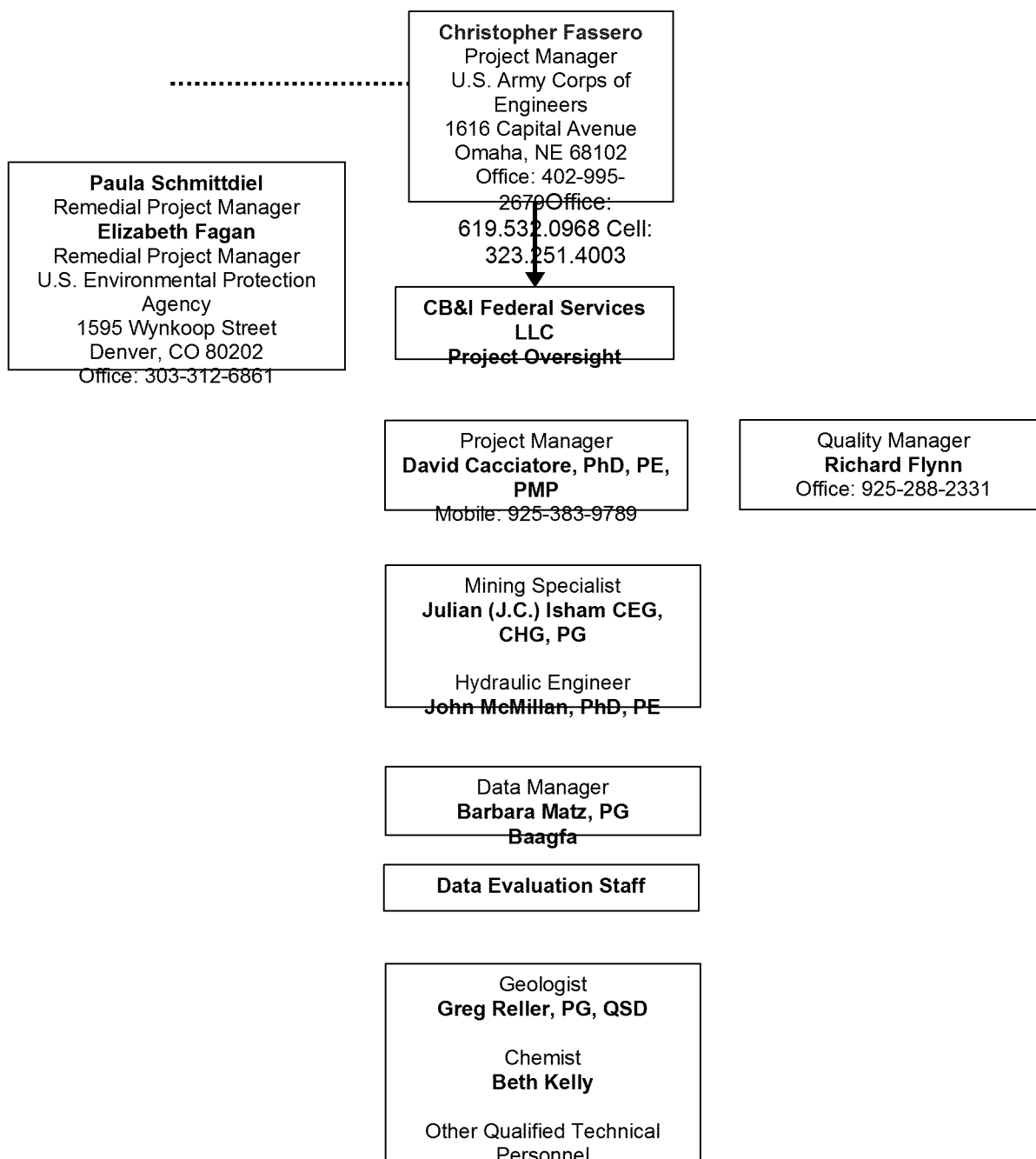
Crosswalk: Worksheets not applicable to this QAPP

Optimized UFP-QAPP Worksheets		2106-G-05 QAPP Guidance Section	
10	Conceptual Site Model	2.2.5	Project Background, Overview, and Intended Use of Data
12	Measurement Performance Criteria	2.2.6	Data/Project Quality Objectives and Measurement Performance Criteria
13	Secondary Data Uses and Limitations	Ch. 3	QAPP Elements for evaluating existing data
15	Project Action Limits and Laboratory-Specific Detection / Quantitation Limits	2.2.6	Data/Project Quality Objectives and Measurement Performance Criteria
17	Sampling Design and Rationale	2.3.1	Sample Collection Procedure, Experimental Design, and Sampling Tasks
18	Sampling Locations and Methods	2.3.1	Sample Collection Procedure , Experimental Design, and Sampling Tasks
		2.3.2	Sampling Procedures and Requirements
19 & 30	Sample Containers, Preservation, and Hold Times	2.3.2	Sampling Procedures and Requirements
20	Field QC	2.3.5	Quality Control Requirements
21	Field SOPs	2.3.2	Sampling Procedures and Requirements
22	Field Equipment Calibration, Maintenance, Testing, and Inspection	2.3.6	Instrument/Equipment Testing, Calibration and Maintenance Requirements, Supplies and Consumables
23	Analytical SOPs	2.3.4	Analytical Methods Requirements and Task Description
24	Analytical Instrument Calibration	2.3.6	Instrument/Equipment Testing, Calibration and Maintenance Requirements, Supplies and Consumables
25	Analytical Instrument and Equipment Maintenance, Testing, and Inspection	2.3.6	Instrument/Equipment Testing, Calibration and Maintenance Requirements, Supplies and Consumables
26 & 27	Sample Handling, Custody, and Disposal	2.3.3	Sample Handling, Custody Procedures, and Documentation
28	Analytical Quality Control and Corrective Action	2.3.5	Quality Control Requirements
34	Data Verification and Validation Inputs	2.5.1	Data Verification and Validation Targets and Methods

35	Data Verification Procedures	2.5.1	Data Verification and Validation Targets and Methods
36	Data Validation Procedures	2.5.1	Data Verification and Validation Targets and Methods
37	Data Usability Assessment	2.5.2	Quantitative and Qualitative Evaluations of Usability
		2.5.3	Potential Limitations on Data Interpretation
		2.5.4	Reconciliation with Project Requirements
31, 32, & 33	Assessments and Corrective Action	2.4	Assessment and Data Review
		2.5.5	Reports to Management

QAPP Worksheets #3 and #5: Project Organization and QAPP Distribution

All lines of responsibility (solid lines) and lines of communication (dotted lines) are provided. All parties shown in the organization chart below will receive copies of the QAPP.



QAPP Worksheets #4, #7, #8: Personnel Qualifications and Sign-Off Sheet

This Worksheet identifies key project personnel performing tasks identified in this QAPP, and documents that key project personnel overseeing and/or performing site work have read the applicable sections of the QAPP and will perform the tasks as described.

Project Personnel	Project Title/ Role	Education/ Experience	Specialized Training/ Certification	Signature/ Date
CB&I				
David Cacciatore, PhD, PE, PMP	Project Manager (PM). Manages and executes all services related to fulfilling the PWS; serves as single Point of Contact (POC).	19 years of experience in project management of mining projects and/or large watershed projects	Professional Engineer, Project Management Professional	
Richard Flynn	Quality Manager. Administers the QC Plan, conducts features of work inspections, and manages QC documentation and records	25 years of experience in quality oversight of investigation and remediation projects	Quality Control Management	
Julian (J.C.) Isham, CEG, CHG, PG	Mining Specialist	40 years of experience in managing monitoring, groundwater protection, feasibility studies and remedial designs at mine and landfill sites.	Certified Engineering Geologist, Certified Hydrogeologist, Professional Geologist	
John McMillan, PhD, PE	Hydraulic Engineer	30 years of environmental experience, including major remedial projects, mine site investigation, and EPA support.	Professional Civil Engineer, Professional Geotechnical Engineer	

Greg Reller, PG, QSD	Geologist	28 years of experience in managing CERCLA studies at mining sites	Professional Geologist, Qualified SWPPP Developer	
Beth Kelly	Chemist	30 years of analytical chemistry experience including the EPA contract laboratory program and mine and watershed sites	Juris Doctorate	
Technical Personnel	Certified professional personnel, including geologists, engineers, and chemists, who are capable of evaluating environmental data reports	At least five years of experience in planning, execution, and reporting of environmental investigation and/or remediation projects	Professional Geologist, Professional Engineer	

QAPP Worksheet #6: Communication Pathways

Communication Drivers	Organization	Name	Contact Information	Procedure
QAPP Review and Approval	USACE PM	Christopher Fassero	402-995-2679	USACE provides project oversight and support to CB&I, and will review/approve the QAPP. Any major changes to implementation of the QAPP will be approved by the USACE PM.
QAPP Review and Approval	EPA Remedial Project Manager (RPM)	Paula Schmittiel	303-312-6861	EPA will review and approve the QAPP. Any major changes to implementation of the QAPP will be approved by the EPA PM.
Management of Project Phases	CB&I PM	David Cacciatore	925-288-2299	Tracks work progress and prepares submittals to EPA as required in the PWS. Responsible for all reporting to USACE and EPA oversight personnel. Conduit for all communications between CB&I team, USACE, and EPA.
Corrective Actions	CB&I Quality Manager	Richard Flynn	925-288-2331	QC oversight of work; determines the need for corrective actions if any; maintains the approved QAPP.

The EPA Region 8 QA Document Review Crosswalk form, for the QAPP for the review and organization of existing environmental data for the UAMD, has been included with the transmittal of the QAPP (EPA, 2012).

QAPP Worksheet #9: Project Planning Session Summary

Date of Planning Session: May 20, 2015			
Location: Teleconference			
Purpose: Project Kick off Meeting			
Participants:			
Name	Organization	Title/Role	Email/Phone
Paula Schmitt diel	EPA	RPM	schmittdiel.paula@epa.gov 303-312-6861
Christopher Fassero	USACE	PM	christopher.a.fassero@usace.army.mil 402-995-2679
Mary Darling	USACE	Program Manager	mary.n.darling@usace.army.mil 402-995-2116
David Cacciatore	CB&I	PM	david.cacciatore@cbifederaleservices.com 925-383-9789
Walt Migdal	CB&I	Construction Engineering & Management	walter.migdal@cbifederaleservices.com 505.262.8908
Dan Baden	CB&I	Geologist	dan.baden@cbifederaleservices.com 925.288.2014
John McMillan	CB&I	Hydraulic Engineer	john.mcmillan@cbifederaleservices.com 925.288.2223
Nadia Burleson	Burleson Consulting	Engineer	nb@burlesonconsulting.com 916.984.4651
Greg Reller	Burleson Consulting	Geologist	gr@burlesonconsulting.com 916.984.4651
Beth Kelly	Burleson Consulting	Chemist	bk@burlesonconsulting.com 916.984.4651

QAPP Worksheet #11: Project Data Quality Objectives

11.1 State the Problem

Step 1: Define the problem that necessitates the study. Identify the planning team members, including decision-makers, and determine resources such as budget, personnel, and schedule.

A large number of documents (over 500 documents for the Cement Creek Drainage alone) exist that record a variety of previous investigations in the area of concern. Similar document lists are anticipated for other portions of the study area. The content and quality of the various documents is not known. Professional personnel with experience in a variety of environmental investigations are needed to evaluate the documents in order to determine if potential additional investigation efforts are necessary to fully evaluate the areas of concern.

11.2 Identify the Goal of the Study

Step 2: State how data will be used in meeting objectives and solving the problem, identify study questions, define alternative outcomes.

The principal study question is: Do previous investigations provide usable site data, and what is the quality of those data? In order to determine whether the study question is answered, data source documents will first be identified. Then an initial evaluation of each document will be conducted using the Document Evaluation Checklist provided in Appendix B, which allows every data source document to be checked for a basic set of criteria. Those documents with high evaluation rankings (i.e., meeting many of the basic criteria) will then undergo additional detailed review of their data management process, as recorded on Page 2 of the Appendix B checklist. These document reviews will verify whether adequate controls were in place during each investigation to assure the quality of the data obtained. Assessment of the combined document review results may be used to indicate where data gaps exist.

In terms of process, the Document Evaluation Checklist will be converted to an electronic form which will input the information into a database or other searchable format. The format will be searchable by key fields, to aid in the generation of tables for the project reports.

11.3 Identify Information Inputs

Step 3: Identify data and information needed to answer study questions.

Each document will be reviewed by a person with appropriate qualifications to assess its contents and quality. The Document Evaluation Checklist (Appendix B) will provide a

uniform means to evaluate each document. The higher the evaluation ranking, the greater the confidence in the document's overall quality.

11.4 Define the Boundaries of the Study

Step 4: Define target population of interest; specify the spatial and temporal boundaries; determine the practical constraints on collecting data.

The scope of the data review includes data from projects conducted at Mineral Creek, Cement Creek, and portions of the upper Animas River. The study is concerned with mining impacts to soil, groundwater, and surface water in these areas. The temporal boundaries range from the onset of mining in the area (late 1800s) to the current time. The period of performance of this task is anticipated to conclude on November 7, 2015, 6 months from the task order award.

The documents may be obtained from a number of sources, as described in the PWS, and additional sources may become known in the process of obtaining these documents. It is necessary for all documents to be in electronic format, for ease of transmitting, reviewing, and storing.

11.5 Develop the Analytic Approach

Step 5: Define the parameter of interest; develop the logic for drawing conclusions from findings

A report that is based on standardized and verified investigative and quality procedures will have more bearing than one that is not. A review of documents to verify that appropriate procedures were in place will ensure that quality data are applied to the problem, and will identify any areas of missing information, i.e. "data gaps."

11.6 Specify Performance or Acceptance Criteria

Step 6: Develop acceptable criteria for existing data being considered for use.

Documents that are reviewed will be ranked based on the number of items that are checked on the Document Evaluation Checklist (Appendix B). Page 1 of the Document Evaluation Checklist allows a general evaluation of the document and Page 2 provides a weighted evaluation of various aspects and procedures that contribute to data acceptability. A higher evaluating ranking indicates that a greater number of quality procedures apply to the results. Some documents may not be reviewed if a more complete version exists (i.e., a draft version may not be reviewed if a final version is also present for review). Minor documents may not be reviewed if the document is drawn from a more comprehensive document, or the minor

document is a working product which led to a more comprehensive document. If a document is not reviewed, the checklist will report the reason.

Documents with a high initial evaluation ranking will undergo a detailed assessment of the investigation process to assure that the data are of sufficient quality to guide future project planning.

11.7 Optimize the Plan for Obtaining Data

Step 7: Review the Data Quality Objectives outputs; develop data collection design alternatives; formulate mathematical expressions for each design; select sample size that satisfies the DQOs; decide on the most resource-effective design or agreed alternative; and document details in the QAPP.

The design for evaluating previous investigations in the area of concern is optimized by applying the same Document Evaluation Checklist to all available documents. The resulting data can streamline ongoing work by awarding higher evaluation rankings to higher quality documents. Evaluation of the combined review results can also indicate areas of missing information (“data gaps”).

QAPP Worksheets #14/16: Project Tasks and Schedule

14.1 Scope of Work

These worksheets describe the project activities, people responsible for their execution, and planned start and end dates.

Activity	Responsible Party	Planned Start Date	Planned Completeness Date	Deliverable	Deliverable Due Date
QAPP	CB&I	5/8/2015	6/30/2015	Report	6/30/2105
Data List and Sources Searched	CB&I / Burleson	5/8/2015	8/5/2015	Report	8/5/2015
Upper Animas Data Report	CB&I / Burleson	8/6/2015	10/8/2015	Report	10/8/2015
Data Gap Analysis and Planning Report	CB&I / Burleson	9/4/2015	10/30/2015	Report	10/30/2015

14.2 Data Recording and Transfer

Electronic copies of previous investigation reports will be catalogued, for potential further consultation through the task order period of performance. A separate Document Evaluation Checklist (Appendix B) will be produced for each document evaluated, and all completed checklists will be maintained in the project files.

Throughout the duration of the project, bi-weekly status reports will be provided in a conference call or by electronic mail if a call is not held. The status reports will be prepared by the PM and transmitted to the RPM.

The final deliverable, Data Gap Analysis and Planning Report, will be transmitted as hard copy and electronic file. Supporting documents, including all completed Document Evaluation Checklists and the index of documents reviewed, will be provided in electronic form only with the final deliverable.

QAPP Worksheet #29: Project Documents and Records

Records	Generation	Verification	Storage Location
Previous Investigation Reports	Various	NA	CB&I Project File
Document Evaluation Checklists	CB&I Technical Personnel	CB&I QC Manager	CB&I Project File

References

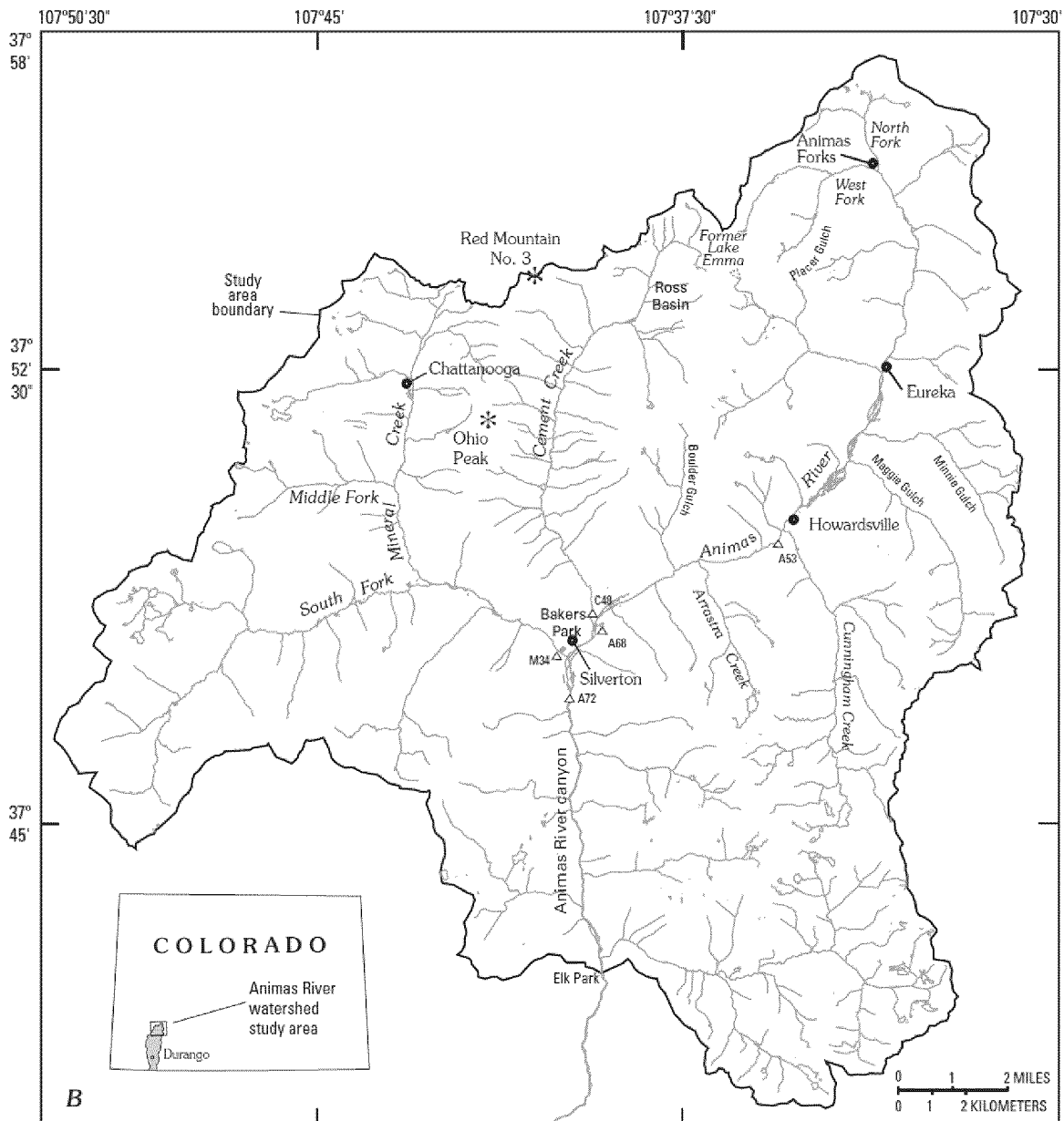
Environmental Protection Agency, 2012. EPA Region 8 QA Document Review Crosswalk. <http://www2.epa.gov/region8/qa-forms-region-8>. Update # 2 8-2012.

Intergovernmental Data Quality Task Force, 2012. *Uniform Federal Policy (UFP) for Quality Assurance Project Plans (QAPPs), Optimized UFP-QAPP Worksheets EPA, DoD and DOE*. http://www2.epa.gov/sites/production/files/documents/ufp_qapp_worksheets.pdf. March.

Intergovernmental Data Quality Task Force, 2005. *Uniform Federal Policy for Quality Assurance Project Plans: Evaluating, Assessing, and Documenting Environmental Collection and Use Programs, Part 2A: UFP-QAPP Workbook*. http://www2.epa.gov/sites/production/files/documents/ufp_qapp_v1_0305.pdf. March.

Figure

Figure 1. Upper Animas River Watershed Study Area [PWS Figure 2B]



(Note: small triangles denote streamflow gauging stations.)

Appendix A

List of Documents to be Reviewed

Appendix B

Document Evaluation Checklist